for species are for the most part new to the state. The list includes 226 species, and among them there is a new species of *Oedogonium* (*O. americanum*), and new varieties of *Vaucheria geminata* and *Oedogonium undulatum*.

VAN ALDERWERELT,[19] in continuing his studies of Malayan pteridophytes, has described 27 new species of ferns, among them a new genus (*Campylogramma*), 11 new species of *Lycopodium*, and 7 new species of *Selaginella*.—J. M. C.

Direct reading potentiometers.—The electromotive force of the hydrogen electrode bears a logarithmic relation to the normal hydrogen-ion concentration H+ of the solution. Where large numbers of determinations are concerned, the calculation of the reaction of the solution in terms of normal acidity becomes laborious. An attempt to simplify the process was made by SÖRENSON, who introduced the P_h values. Since the P_h value is the negative logarithm of the hydrogen-ion concentration, the relation existing between these numbers and the usual method of expressing acidity in terms of normality is not always clear.

BOVIE[20] has devised a potentiometer which reads directly in terms of hydrogen-ion concentration. In the original article a full discussion is given of the method of operating the instrument, as well as of the construction of the dip electrode to be used in titrations. This instrument enables the operator to titrate a solution to a definite hydrogen-ion concentration and thus avoid the error due to misjudgment of the end point as found by the indicator method. Another advantage of the instrument is that it makes it possible to titrate two different acids in the same solution or to titrate successively the hydrogen ions of polyvalent acids or acid salts. It also makes possible the titration of such acids as boric acid, which give an end point on the alkaline side of the neutral point of distilled water. The author gives a number of other very useful applications for the instrument. The apparatus is very well adapted for making large numbers of determinations rapidly and with an accuracy sufficient for ordinary purposes.

Using logarithmic resistances instead of the logarithmic scale, BARTELL[21] has devised a similar apparatus, which avoids the sources of error in the BOVIE apparatus and gives a greater accuracy. It is not expected that this type of potentiometer will replace the older forms which are adapted to reading very small potentials.—R. B. HARVEY.

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[19] VAN ALDERWERELT, Capt. C. R. W. K., New or interesting Malayan ferns. 8 and 9. Bull. Jard. Bot. Buitenzorg nos. 23 and 24. pp. 27 and 8. *pls.* 4. 1916 and 1917.

[20] BOVIE, W. T., A direct reading potentiometer for measuring and recording both the actual and total reaction of solutions. Jour. Med. Research **33**:297. 1915.

[21] BARTELL, F. E., A direct reading ionometer. Jour. Amer. Chem. Soc. **39**:630. 1917.